

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : **BOX PATENT APPLICATION**

Christophe BOYER et al. : Examiner: Unassigned

Serial No.: Unassigned : Group Art Unit: Unassigned

Filed: August 16, 2001 :

For: **DEVICE FOR INJECTING A FLUID LOCATED BETWEEN TWO SUCCESSIVE  
BEDS TO SIMULTANEOUSLY PRODUCE AND DISTRIBUTE A POLYPHASE  
MIXTURE**

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination, Applicants wish to amend the above-identified application as indicated below:

**IN THE ABSTRACT**

Please delete the existing abstract and replace with the attached Abstract of the Disclosure.

**IN THE CLAIMS**

Please cancel claims 3-11 without prejudice or disclaimer.

Please amend claim 1 as follows:

1. (Amended) A device for injecting a secondary fluid located between two successive upper and lower granular beds to produce and distribute a polyphase mixture between said secondary fluid and a fluid or mixture of fluids originating from the upper granular bed, said device comprising a chamber for injecting a secondary fluid, means for bringing said secondary fluid and at least a portion of fluid or mixture of fluids originating from the upper granular bed

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into contact, and means for simultaneous distribution of the mixture resulting from said contact to the lower granular bed.

Please add the following new claims:

-- 12. A device according to claim 1, in which said contact and distribution means are conduits (204) with a substantially constant diameter along their axial length traversing said injection chamber and pierced with orifices (208) over their lateral wall.

13. A device according to claim 1, comprising conduits (206) for the passage of a gaseous fraction of fluid or a fluid mixture originating from the upper granular bed, traversing the chamber in a fluid tight manner, the height of which is greater than the maximum height reached by the liquid, the upper portions of which are provided with a plate preventing flow of the liquid fraction of the fluid or fluid mixture originating from the upper granular bed through said conduits.

14. A device according to claim 12, comprising conduits (206) for the passage of a gaseous fraction of fluid or a fluid mixture originating from the upper granular bed, traversing the chamber in a fluid tight manner, the height of which is greater than the maximum height reached by the liquid, the upper portions of which are provided with a plate preventing flow of the liquid fraction of the fluid or fluid mixture originating from the upper granular bed through said conduits.

15. A device according to claim 1, in which said contact and distribution means comprise:

conduits (222) allowing passage of the secondary fluid into a zone located above said chamber;

tubes or mixer channels (224) with a substantially constant diameter along their axial length traversing the chamber in a fluid tight manner, the upper portions of which are provided with orifices for passage and mixing of a secondary fluid and at least a portion of the fluid or mixture of fluids issuing from the upper granular bed.

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16. A device according to claim 13, in which said contact and distribution means comprise:

conduits (222) allowing passage of the secondary fluid into a zone located above said chamber;

tubes or mixer channels (224) with a substantially constant diameter along their axial length traversing the chamber in a fluid tight manner, the upper portions of which are provided with orifices for passage and mixing of a secondary fluid and at least a portion of the fluid or mixture of fluids issuing from the upper granular bed.

17. A device according to claim 1, characterized in that the contact and distribution means extend below the chamber by a distance  $h_t$ .

18. A device according to claim 15, in which the distance between the bottom of the conduits, tubes or mixer channels and the upper surface of the lower bed is in the range 0 to 50 mm, 0 excluded and the density of the conduits (204), (224) is more than 80 per square metre.

19. A fixed bed reactor, comprising:

at least one upper bed of granular solids;

at least one device for injecting a secondary fluid located between two successive upper and lower granular beds to produce and distribute a polyphase mixture between said secondary fluid and a fluid or mixture of fluids originating from the upper granular bed, said device comprising a chamber for injecting a secondary fluid, means for bringing said secondary fluid and at least a portion of fluid or mixture of fluids originating from the upper granular bed into contact, and means for simultaneous distribution of the mixture resulting from said contact to the lower granular bed located downstream of said fluids;

at least one bed of granular solids located downstream of said means;

at least one separate line for injecting secondary fluid into the chamber of said means, said separate line being substantially perpendicular with respect to the axis of the reactor.

20. A reactor according to claim 19, having a vertical axis and said separate line being substantially perpendicular with respect to the axis of the reactor.

21. A reactor according to claim 19, comprising means for circulating liquid and gas phases through the granular bed or beds in co-current dropper mode.

22. A reactor according to claim 19, wherein the bed or beds of granular solids comprise at least one catalytic granular solid.

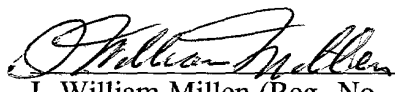
23. A process comprising conducting a hydrodesulphurisation, selective hydrogenation or hydrodenitrogenation reaction in a reactor according to claim 19. –

### REMARKS

A principal purpose of this Preliminary Amendment is to remove multiply dependent claims, thereby facilitating examination and saving fees, Applicants reserving the right to reintroduce claims to cancelled combined subject matter. New claims 12-23 substantially correspond to cancelled claims 3-11.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned “**Version With Markings To Show Changes Made**”.

Respectfully submitted,

  
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### **ABSTRACT OF THE DISCLOSURE**

A device located between two successive granular beds (203) and (205) for injecting a secondary fluid can produce and distribute a polyphase mixture between said secondary fluid and a fluid or mixture of fluids originating from the upper granular bed and comprises a chamber for injecting a secondary fluid (201), the secondary fluid being injected into said device, and means (204) for bringing said secondary fluid into contact with at least a portion of the fluid or mixture of fluids originating from the upper granular bed (203) and for simultaneous distribution (208) of the mixture resulting from said contact to the lower granular bed (205).

Version With Markings To Show Changes Made

**IN THE ABSTRACT**

The abstract has been replaced with the attached Abstract of the Disclosure, therefore no marked-up version is necessary.

**IN THE CLAIMS**

Claim 1 has been amended as follows:

1. (Amended) A device for injecting a secondary fluid located between two successive upper and lower granular beds to produce and distribute a polyphase mixture between said secondary fluid and a fluid or mixture of fluids originating from the upper granular bed, ~~characterized in that it comprises~~ said device comprising a chamber for injecting a secondary fluid, ~~in that said secondary fluid is injected into said device, and in that it also comprises~~ means for bringing said secondary fluid and at least a portion of ~~the~~ fluid or mixture of fluids originating from the upper granular bed into contact, and means for simultaneous distribution of the mixture resulting from said contact to the lower granular bed.

Claims 3-11 have been cancelled.

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